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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/464,520	12/15/1999	MASAHIKO NAKAYAMA	P/1878-135	7671

7590 04/30/2003

OSTROLENK FABER GERB & SOFFEN
1180 AVENUE OF THE AMERICAS
NEW YORK, NY 100368403

EXAMINER	
LELE, TANMAY S	

ART UNIT	PAPER NUMBER
2684	11

DATE MAILED: 04/30/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/464,520	NAKAYAMA, MASAHIKO	
	Examiner	Art Unit	
	Tanmay S Lele	2684	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *14 February 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *15 December 1999* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

Response to Arguments

1. Applicant's arguments filed 14 February 2003 have been fully considered but they are not persuasive.

2. Applicant's arguments fail to comply with 37 CFR 1.111(b) because they amount to a general allegation that the claims define a patentable invention without specifically pointing out how the language of the claims patentably distinguishes them from the references.

Regarding claims 1 – 6 and 10 – 16 Applicant attempts to overcome the rejection by stating, Rakib does not disclose "calculating a gain set value with which an amplitude value of a multiplexed baseband signal matches a dynamic range in D/A conversion based on the number of transmission codes with is the number of multiplexed baseband signals." As stated in the previous Office Action (paper number 8, pages 3 – 4) it is believed these limitations are met. In the cited passages, Rakib states the scalar amplifier, "scales the amplitude level… in accordance with a signal … which indicates the activity of the modem, i.e., how many timeslots are currently in use…" and further states, "when few timeslots are active, the summation of the CDMA spreading matrix multiplication partial products do not lead to chip amplitudes which extend to the full limits of the D/A converter's dynamic range" (column 76, lines 4 – 8). As Rakib's system is combines CDMA in TDMA (as stated in the cited passage and column 7, lines 22 –37 and further in column 8, lines 46 – 48 and again in column 6, lines 37 – 65). Hence, as stated in the cited passages from the previous Office Action and above, when fewer timeslots are utilized, fewer codes are inherently used (as a timeslot in Rakib's invention correlates to baseband data which is spread with its own code, as seen in Figure 32 and column 6, lines 37 – 56 as an example). Hence, with fewer codes, more noise would be induced (as in this example, with

fewer slots and thus spreading codes used, the signal would enter the D/A converter at the botton of its dynamic range), as stated in the cited passages from the previous Office Action. Hence, the Examiner is not persuaded by the Applicant's argument that the reference does not teach, recite, or suggest the features disclosed.

3. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., formed without using a multiplier) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Regarding claim 7, Applicant attempts to overcome the rejection by stating, "the level adjusting circuit of claim 7 is formed without using a multiplier." This recitation is not cited in the claim. Applicant further states, "the level adjusting circuit … requires a plurality of bit shifters that shift input baseband signals to the right by a certain bits and a plurality of switches for selecting outputs from said bit shifters in accordance with a gain desired to be set." As cited in the previous Office Action (paper no 8, page 3) and seen in the associated figure (Figure 3), the above requirements are met (note the LSB shift register that has a plurality of bit shifters and the AND/OR gates that are configured as switches). Hence, the Examiner is not persuaded by the Applicant's argument that the reference does not teach, recite, or suggest the features disclosed.

4. Applicant's arguments with respect to claims 8, 9 and 17 have been considered but are moot in view of the new ground(s) of rejection.

DETAILED ACTION

Specification

5. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

7. Claim 7 is rejected under 35 U.S.C. 102(e) as being anticipated by Ohnushi et al. (Ohnishi, US Patent No 4,261,051).

Regarding claim 7, Ohnishi teaches of a level adjusting circuit comprising a plurality of bit shifters that shift input baseband signals to the right by different certain bits (column 4, lines 46 – 53), a plurality of switches for selecting outputs from said respective bit shifters in accordance with a desired gain desired to be set (column 4, lines 28 – 45; note that the AND gates are configured as switches), and an adder for adding outputs from said respective switches for output as one signal (column 4, lines 25 – 28; note that the OR gate as configured will actually provide for the final sum value at the output).

8. Claim 10 is rejected under 35 U.S.C. 102(e) as being anticipated by Rakib et al. (Rakib, US Patent No. 6,307,868).

Regarding claim 10, Rakib teaches of a method of controlling a transmission level in a baseband signal multiplexing circuit for multiplexing a plurality of baseband signals spread with different spread codes into one baseband signal, said method comprising the steps of calculating a gain set value with which an amplitude value of a multiplexed baseband signal matches a dynamic range in D/A conversion based on the number of transmission codes which is the number of multiplexed baseband signals and adjusting the amplitude value of the code-multiplexed baseband signal prior to the D/A conversion based on the gain set value (beginning column 75, line 62 and ending column 76, line 18).

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. Claims 1 – 6 and 11–16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kornfeld et al. (Kornfeld, US Patent No. 5,974,041) in view of Rakib et al. (Rakib, US Patent No. 6,307,868).

Regarding claim 1, Kornfeld teaches of a baseband signal multiplexing circuit for multiplexing a plurality of baseband signals spread with different spread codes into one baseband signal comprising a plurality of baseband filters for respectively limiting bands of the respective baseband signals input thereto (seen in Figure 7 and described in column 10, lines 64 – 67), adding means for adding and code-multiplexing the plurality of baseband signals with the bands limited by said respective baseband filters to produce one baseband signal (seen in Figure 7 and detailed in column 11, lines 5-7), and a D/A converting means for converting the baseband signal which is a digital signal outputted into an analog signal (seen in Figure 7 and described in column 11, lines 1- 3).

Kornfeld does not teach of a level adjusting means for adjusting an amplitude value of the baseband signal produced by said adding means based on a control signal to output the signal or of a gain setting means for calculating a gain set value with which the amplitude value of the baseband signal, outputted from said level adjusting means is adjusted to an amplitude value matching a dynamic range of said D/A converting means based on the number of transmission codes which is the number of multiplexed baseband signals, and for notifying said level adjusting means of the gain set value with said control signal.

In an analogous art dealing with synchronous CDMA transmission, Rakib teaches of level adjusting means for adjusting an amplitude value of the baseband signal produced by said adding means based on a control signal to output the signal or of a gain setting means for

calculating a gain set value with which the amplitude value of the baseband signal, outputted from said level adjusting means is adjusted to an amplitude value matching a dynamic range of said D/A converting means based on the number of transmission codes which is the number of multiplexed baseband signals, and for notifying said level adjusting means of the gain set value with said control signal (as seen in Figure 32 and 33 and detailed starting on column 75, line 63 and ending column 76, line 17).

It would have been obvious to one skilled in the art at the time of invention to have included into Kornfeld's system of baseband transmission, the system of adjusting dynamic range as described by Rakib for the purposes of operating within the dynamic range of the D/A converter and thus allowing for a cleaner transmitted signal (as internal noise from the D/A converter is present when not operating in the D/A converter's dynamic range), as taught by Rakib.

Regarding claim 2, Kornfeld teaches of a baseband signal multiplexing circuit for multiplexing a plurality of baseband signals spread with different spread codes into one baseband signal, comprising a plurality of baseband filters for respectively limiting bands of the respective baseband signals input thereto (seen in Figure 7 and described in column 10, lines 64 – 67), adding means for adding and code-multiplexing the plurality of baseband signals to produce one baseband signal (as seen in Figure 7 and detailed in column 11, 5-8), and D/A converting means for converting the baseband signal which is a digital signal outputted (as seen in Figure 7 and detailed in column 11, lines 1 – 5).

Kornfeld does not teach of a gain setting means for calculating a gain set value with which an amplitude value of the baseband signal outputted from said adding means is adjusted to

an amplitude value matching a dynamic range of said D/A converting means based on the number of transmission codes which is the number of multiplexed baseband signals and for notifying said level adjusting means of the gain set value with said control signal or of a plurality of level adjusting means for respectively adjusting amplitude values of the plurality of baseband signals with the bands limited by said respective baseband filters based on a control signal to output the signals. Kornfeld also does not teach of the line-up of components as claimed.

In an analogous art dealing with synchronous CDMA transmission, Rakib teaches of a gain setting means for calculating a gain set value with which an amplitude value of the baseband signal outputted from said adding means is adjusted to an amplitude value matching a dynamic range of said D/A converting means based on the number of transmission codes which is the number of multiplexed baseband signals, and for notifying said level adjusting means of the gain set value with said control signal or of a plurality of level adjusting means for respectively adjusting amplitude values of the plurality of baseband signals with the bands limited by said respective baseband filters based on a control signal to output the signals (as seen in Figure 32 and 33 and detailed starting on column 75, line 63 and ending column 76, line 17).

It would have been obvious to one skilled in the art at the time of invention to have included into Kornfeld's system of baseband transmission, the system of adjusting dynamic range as described by Rakib for the purposes of operating within the dynamic range of the D/A converter and thus allowing for a cleaner transmitted signal (as internal noise from the D/A converter is present when not operating in the D/A converter's dynamic range), as taught by Rakib.

Kornfeld in view of Rakib do not teach of the line-up of components as claimed. As the purpose of the invention is to provide means such that the dynamic range criteria of the D/A converter is met, it is believed that the merely moving and distributing the function of these components (ie the level adjusting circuit) to achieve this goal is obvious and not novel, as no benefit in changing component position or in distributing its function has been detailed. Therefore, it would have been obvious to one skilled in the art, at the time of invention, to have added multiple level adjusting circuits at the output of the baseband band filters and prior to the summer for the purposes of obtaining a baseband signal that was within the dynamic range of the D/A converter and would thus allow for a less noisy baseband signal to be transmitted.

Regarding claim 3, Kornfeld teaches of a baseband signal multiplexing circuit for multiplexing a plurality of baseband signals spread with different spread codes into one baseband signal comprising of a plurality of baseband filters for respectively limiting bands of the respective baseband signals input thereto (seen in Figure 7 and described in column 10, lines 64 – 67), an adding circuit for adding and code-multiplexing the plurality of baseband signals outputted to produce one baseband signal (as seen Figure 7 and detailed in column 11, lines 3 – 7), and D/A converting circuit for converting the baseband signal which is a digital signal into an analog signal (as seen in Figure 7 and detailed in column 11, lines 1 – 6).

Kornfeld does not teach of a plurality of level adjusting circuits for respectively adjusting amplitude values of the plurality of baseband signals with the bands limited by said respective baseband filters based on a plurality of control signals to output the signals, of gain setting circuit that calculated for respective said level adjusting circuits gain set value with which an amplitude value of the baseband signal outputted from said adding circuit is adjusted to an amplitude value

matching a dynamic range of said D/A converting circuit said value based on the number of transmission codes which is the number of multiplexed baseband signals and said gain set value based on inter-channel ratio information said inter-channel ratio information for specifying an amplitude ratio of the respective baseband signals when the plurality of baseband signals are multiplexed, and for notifying said level adjusting circuit of the gain set values with said plurality of control signals, nor of the line-up of components as claimed.

In an analogous art dealing with synchronous CDMA transmission, Rakib teaches of a (plurality of) level adjusting circuits for respectively adjusting amplitude values of the plurality of baseband signals with the bands limited by said respective baseband filters based on a plurality of control signals to output the signals (as seen in Figure 32 and 33, and detailed in column 75, lines 62 – 67) and of gain setting circuit for calculating for respective said level adjusting circuits gain set value with which an amplitude value of the baseband signal outputted from said adding circuit is adjusted to an amplitude value matching a dynamic range of said D/A converting based circuit on the number of transmission codes which is the number of multiplexed baseband signals and based on inter-channel ratio information (specifically column 75, lines 62 – 66) said interchannel ratio information specifying an amplitude ratio of the respective baseband signals when the plurality of baseband signals are multiplexed and notifies said level adjusting circuit of the gain set values with said (plurality of) control signals (as seen in Figures 32 and 33 and described beginning column 75, line 62 and ending column 76, line 18).

It would have been obvious to one skilled in the art at the time of invention to have included into Kornfeld's system of baseband transmission, the system of adjusting dynamic range as described by Rakib for the purposes of operating within the dynamic range of the D/A

converter and thus allowing for a cleaner transmitted signal (as internal noise from the D/A converter is present when not operating in the D/A converter's dynamic range), as taught by Rakib.

Kornfeld in view of Rakib do not teach of the line-up of components as claimed. As the purpose of the invention is to provide means such that the dynamic range criteria of the D/A converter is met, it is believed that the merely moving and distributing the function of these components (ie the level adjusting circuit) to achieve this goal is obvious and not novel, as no benefit in changing component position or in distributing its function has been detailed. Therefore, it would have been obvious to one skilled in the art, at the time of invention, to have added multiple level adjusting circuits at the output of the baseband band filters and prior to the summer for the purposes of obtaining a baseband signal that was within the dynamic range of the D/A converter and would thus allow for a less noisy baseband signal to be transmitted.

Regarding claim 4, Kornfeld teaches of a baseband signal multiplexing circuit for multiplexing a plurality of baseband signals spread with different spread codes into one baseband signal comprising of adding means for adding and code-multiplexing the respective baseband signals input thereto to produce one baseband signal (as seen in Figure 7 and described in column 11, lines 3-7), a baseband filter for limiting a band of the baseband signal produced by said adding means (as seen in Figure 7 and detailed in column 10, lines 64 – 67), and D/A converting means for converting the baseband signal which is a digital signal into an analog signal (as seen in Figure 7 and detailed in column 11, lines 1-7).

Kornfeld does not teach of a level adjusting means for adjusting an amplitude value of the baseband signal with the band limited by said baseband filter based on a control signal to

output the signal, gain setting means for calculating a gain set value with which the amplitude value of the baseband signal outputted from said level adjusting means is adjusted to an amplitude value matching a dynamic range of said D/A converting means based on the number of transmission codes which is the number of multiplexed baseband signals and for notifying said level adjusting means of the gain set value with said control signal. Kornfeld also does not teach of the of the line-up of components as claimed.

In an analogous art dealing with synchronous CDMA transmission, Rakib teaches of a level adjusting means for adjusting an amplitude value of the baseband signal with the band limited by said baseband filter based on a control signal to output the signal, gain setting means for calculating a gain set value with which the amplitude value of the baseband signal outputted from said level adjusting means is adjusted to an amplitude value matching a dynamic range of said D/A converting means based on the number of transmission codes which is the number of multiplexed baseband signals and for notifying said level adjusting means of the gain set value with said control signal (as seen in Figures 32 and 33 and detailing starting column 75, line 62 and ending column 76, line 18).

It would have been obvious to one skilled in the art at the time of invention to have included into Kornfeld's system of baseband transmission, the system of adjusting dynamic range as described by Rakib for the purposes of operating within the dynamic range of the D/A converter and thus allowing for a cleaner transmitted signal (as internal noise from the D/A converter is present when not operating in the D/A converter's dynamic range), as taught by Rakib.

Kornfeld in view of Rakib do not teach of the line-up of components as claimed. As the purpose of the invention is to provide means such that the dynamic range criteria of the D/A converter is met, it is believed that the merely moving and distributing the function of these components (ie the level adjusting circuit) to achieve this goal is obvious and not novel, as no benefit in changing component position or in distributing its function has been detailed. Therefore, it would have been obvious to one skilled in the art, at the time of invention, to have added multiple level adjusting circuits at the output of the baseband band filters and prior to the summer for the purposes of obtaining a baseband signal that was within the dynamic range of the D/A converter and would thus allow for a less noisy baseband signal to be transmitted.

Regarding claim 5, Kornfeld teaches of a baseband signal multiplexing circuit for multiplexing a plurality of baseband signals spread with different spread codes into one baseband signal comprising of a plurality of baseband filters for respectively limiting bands of the respective baseband signals input thereto (as seen in Figure 7 and detailed in column 10, lines 64 – 67), adding means for adding and code-multiplexing the plurality of baseband signals to produce one baseband signal (as seen in Figure 7 and detailed in column 11, lines 3-7), D/A converting means for converting the baseband signal which is a digital signal into an analog signal (as seen Figure 7 and detailed in column 11, lines 1 – 3).

Kornfeld does not teach of a (plurality of) first level adjusting means for respectively adjusting amplitude values of the plurality of baseband signals with the bands limited by said respective baseband filters based on a plurality of first control signals to output the signals, a second level adjusting means for adjusting an amplitude value of the baseband signal produced by said adding means based on a second control signal to output the signal, gain setting means

for outputting to said respective first level adjusting means the first control signals for adjusting amplitude ratios of the respective baseband signals in accordance with inter-channel ratio information for specifying amplitude ratios of the respective baseband signals when the plurality of baseband signals are multiplexed, for calculating a gain set value with which the amplitude value of the baseband signal outputted from said second level adjusting means is adjusted to an amplitude value matching a dynamic range of said D/A converting means based on the number of transmission codes which is the number of multiplexed baseband signals, and for notifying said second level adjusting means of the gain set value with said second control signal.

In an analogous art dealing with synchronous CDMA transmission, Rakib teaches of a (plurality of first) level adjusting means for respectively adjusting amplitude values of the plurality of baseband signals with the bands limited by said respective baseband filters based on a plurality of first control signals to output the signals, gain setting means for outputting to said respective (first) level adjusting means the first control signals for adjusting amplitude ratios of the respective baseband signals in accordance with inter-channel ratio information for specifying amplitude ratios of the respective baseband signals when the plurality of baseband signals are multiplexed, for calculating a gain set value with which the amplitude value of the baseband signal outputted to an amplitude value matching a dynamic range of said D/A converting means based on the number of transmission codes which is the number of multiplexed baseband signals, and for notifying (said second) level adjusting means of the gain set value with said (second) control signal (as seen in Figures 32 and 33 and detailed starting column 75, line 62 and ending in column 76, line 18).

It would have been obvious to one skilled in the art at the time of invention to have included into Kornfeld's system of baseband transmission, the system of adjusting dynamic range as described by Rakib for the purposes of operating within the dynamic range of the D/A converter and thus allowing for a cleaner transmitted signal (as internal noise from the D/A converter is present when not operating in the D/A converter's dynamic range), as taught by Rakib.

Kornfeld in view of Rakib do not teach of the line-up of components as claimed. As the purpose of the invention is to provide means such that the dynamic range criteria of the D/A converter is met, it is believed that the merely moving and distributing the function of these components (ie the level adjusting circuit) to achieve this goal is obvious and not novel, as no benefit in changing component position or in distributing its function has been detailed. Therefore, it would have been obvious to one skilled in the art, at the time of invention, to have added multiple level adjusting circuits at the output of the baseband band filters and prior to the summer for the purposes of obtaining a baseband signal that was within the dynamic range of the D/A converter and would thus allow for a less noisy baseband signal to be transmitted.

Regarding claim 6, Kornfeld teaches of a baseband signal multiplexing circuit for multiplexing a plurality of baseband signals spread with different spread codes into one baseband signal comprising of adding means for adding and code-multiplexing the plurality of baseband to produce one baseband signal (as seen in Figure 7 and detailed in column 11 lines 3 – 7), a baseband filter for limiting a band of the baseband signal (produced by said adding means) (as seen in Figure 7 and detailed in column 10, lines 64 – 67), and D/A converting means for converting the baseband signal which is a digital signal (outputted from said second level

adjusting means) into an analog signal (as seen in Figure 7 and detailed in column 11, lines 1 – 7).

Kornfeld does not teach of a plurality of first level adjusting means for respectively adjusting amplitude values of said respective baseband signals input thereto based on a plurality of first control signals, a second level adjusting means for adjusting an amplitude value of the baseband signal with the band limited by said baseband filter based on a second control signal to output the signal, gain setting means for outputting to said respective first level adjusting means the first control signals for adjusting an amplitude ratio of the respective baseband signals in accordance with inter-channel ratio information for specifying an amplitude ratio of the respective baseband signals when the plurality of baseband signals are multiplexed for calculating a gain set value with which the amplitude value of the baseband signal outputted from said second level adjusting means is adjusted to an amplitude value matching a dynamic range of said D/A converting means based on the number of transmission codes which is the number of multiplexed baseband signals, and for notifying said second level adjusting means of the gain set value with said second control signal.

In an analogous art dealing with synchronous CDMA transmission, Rakib teaches of a (plurality of first) level adjusting means for respectively adjusting amplitude values of said respective baseband signals input thereto based on a plurality of first control signals, a (second) level adjusting means for adjusting an amplitude value of the baseband signal with the band limited by said baseband filter based on a second control signal to output the signal, gain setting means for outputting to (said respective first) level adjusting means the (first) control signals for adjusting an amplitude ratio of the respective baseband signals in accordance with inter-channel

ratio information for specifying an amplitude ratio of the respective baseband signals when the plurality of baseband signals are multiplexed for calculating a gain set value with which the amplitude value of the baseband signal outputted from said (second) level adjusting means is adjusted to an amplitude value matching a dynamic range of said D/A converting means based on the number of transmission codes which is the number of multiplexed baseband signals, and for notifying said (second) level adjusting means of the gain set value with said (second) control signal (as seen in Figures 32 and 33 and detailed starting column 75, line 62 and ending in column 76, line 18).

It would have been obvious to one skilled in the art at the time of invention to have included into Kornfeld's system of baseband transmission, the system of adjusting dynamic range as described by Rakib for the purposes of operating within the dynamic range of the D/A converter and thus allowing for a cleaner transmitted signal (as internal noise from the D/A converter is present when not operating in the D/A converter's dynamic range), as taught by Rakib.

Kornfeld in view of Rakib do not teach of the line-up of components as claimed. As the purpose of the invention is to provide means such that the dynamic range criteria of the D/A converter is met, it is believed that the merely moving and distributing the function of these components (ie the level adjusting circuit) to achieve this goal is obvious and not novel, as no benefit in changing component position or in distributing its function has been detailed. Therefore, it would have been obvious to one skilled in the art, at the time of invention, to have added multiple level adjusting circuits at the output of the baseband band filters and prior to the

summer for the purposes of obtaining a baseband signal that was within the dynamic range of the D/A converter and would thus allow for a less noisy baseband signal to be transmitted.

Regarding claim 11, Kornfeld teaches of a method of controlling a transmission level in a baseband signal multiplexing circuit for multiplexing a plurality of baseband signals spread with different spread codes into one baseband signal, said method comprising the steps of limiting bands of the respective baseband signals input thereto (column 10, lines 64 – 67), adding and code-multiplexing the plurality of baseband signals with the limited bands to produce one baseband signal (column 11, lines 3 – 10), and D/A converting the baseband signal into an analog signal (column 11, lines 1- 7).

Kornfeld does not teach of calculating a gain set value with which an amplitude value of the code-multiplexed baseband signal matches a dynamic range in D/A conversion based on the number of transmission codes which is the number of multiplexed baseband signals, adjusting the amplitude value of the code multiplexed baseband signal based on the gain set value, or of D/A converting the level adjust digital signal.

In an analogous art dealing with synchronous CDMA transmission, Rakib teaches of calculating a gain set value with which an amplitude value of the code-multiplexed baseband signal matches a dynamic range in D/A conversion based on the number of transmission codes which is the number of multiplexed baseband signals, adjusting the amplitude value of the code multiplexed baseband signal based on the gain set value, or of D/A converting the level adjust digital signal (starting column 75, line 62 and ending column 76, line 18).

It would have been obvious to one skilled in the art at the time of invention to have included into Kornfeld's system of baseband transmission, the system of adjusting dynamic

range as described by Rakib for the purposes of operating within the dynamic range of the D/A converter and thus allowing for a cleaner transmitted signal (as internal noise from the D/A converter is present when not operating in the D/A converter's dynamic range), as taught by Rakib.

Regarding claim 12, Kornfeld teaches of a method of controlling a transmission level in a baseband signal multiplexing circuit for multiplexing a plurality of baseband signals spread with different spread codes into one baseband signal, said method comprising the steps of limiting bands of the respective baseband signals input thereto (column 10, lines 64 – 67), adding and code-multiplexing the plurality of baseband signals to produce one baseband signal (column 11, lines 3 – 10), and D/A converting the baseband signal after the code-multiplexing into an analog signal (column 11, lines 1- 7).

Kornfeld does not teach of calculating a gain set value with which amplitude values of the plurality of baseband signals with the limited bands match a dynamic range in D/A conversion based on the number of transmission codes which is the number of multiplexed baseband signals, adjusting the amplitude values of the plurality of baseband signals with the limited bands based on the gain set value or of adding the signals after amplitude adjustment.

In an analogous art dealing with synchronous CDMA transmission, Rakib teaches of calculating a gain set value with which amplitude values of the plurality of baseband signals with the limited bands match a dynamic range in D/A conversion based on the number of transmission codes which is the number of multiplexed baseband signals, adjusting the amplitude values of the plurality of baseband signals with the limited bands based on the gain set value (starting column 75, line 62 and ending column 76, line 18).

It would have been obvious to one skilled in the art at the time of invention to have included into Kornfeld's system of baseband transmission, the system of adjusting dynamic range as described by Rakib for the purposes of operating within the dynamic range of the D/A converter and thus allowing for a cleaner transmitted signal (as internal noise from the D/A converter is present when not operating in the D/A converter's dynamic range), as taught by Rakib.

Kornfeld in view of Rakib do not teach of the line-up of components as claimed. As the purpose of the invention is to provide means such that the dynamic range criteria of the D/A converter is met, it is believed that the merely moving and distributing the function of these components (ie the level adjusting circuit) to achieve this goal is obvious and not novel, as no benefit in changing component position or in distributing its function has been detailed. Therefore, it would have been obvious to one skilled in the art, at the time of invention, to have added multiple level adjusting circuits at the output of the baseband band filters and prior to the summer for the purposes of obtaining a baseband signal that was within the dynamic range of the D/A converter and would thus allow for a less noisy baseband signal to be transmitted.

Regarding claim 13, Kornfeld teaches of a method of controlling a transmission level in a baseband signal multiplexing circuit for multiplexing a plurality of baseband signals spread with different spread codes into one baseband signal, said method comprising the steps of limiting bands of the respective baseband signals input thereto (column 10, lines 64 – 67), adding and code-multiplexing the plurality of baseband signals to produce one baseband signal (column 11, lines 3 – 10), and D/A converting the baseband signal after the code-multiplexing into an analog signal (column 11, lines 1- 7).

Kornfeld does not teach of calculating for the respective baseband signals gain set values with which amplitude values of the plurality of baseband signals with the limited bands match a dynamic range in D/A conversion based on the number of transmission codes which is the number of multiplexed baseband signals or of adjusting the amplitude values of the plurality of baseband signals with the limited bands based on the gain set values.

In an analogous art dealing with synchronous CDMA transmission, Rakib teaches of calculating for the respective baseband signals gain set values with which amplitude values of the plurality of baseband signals with the limited bands match a dynamic range in D/A conversion based on the number of transmission codes which is the number of multiplexed baseband signals or of adjusting the amplitude values of the plurality of baseband signals with the limited bands based on the gain set values (starting column 75, line 62 and ending column 76, line 18).

It would have been obvious to one skilled in the art at the time of invention to have included into Kornfeld's system of baseband transmission, the system of adjusting dynamic range as described by Rakib for the purposes of operating within the dynamic range of the D/A converter and thus allowing for a cleaner transmitted signal (as internal noise from the D/A converter is present when not operating in the D/A converter's dynamic range), as taught by Rakib.

Kornfeld in view of Rakib do not teach of the line-up of components as claimed. As the purpose of the invention is to provide means such that the dynamic range criteria of the D/A converter is met, it is believed that the merely moving and distributing the function of these

components (ie the level adjusting circuit) to achieve this goal is obvious and not novel, as no benefit in changing component position or in distributing its function has been detailed. Therefore, it would have been obvious to one skilled in the art, at the time of invention, to have added multiple level adjusting circuits at the output of the baseband band filters and prior to the summer for the purposes of obtaining a baseband signal that was within the dynamic range of the D/A converter and would thus allow for a less noisy baseband signal to be transmitted.

Regarding claim 14, Kornfeld teaches of a method of controlling a transmission level in a baseband signal multiplexing circuit for multiplexing a plurality of baseband signals spread with different spread codes into one baseband signal, said method comprising the steps of adding and code-multiplexing the respective baseband signals input thereto to produce one baseband signal (column 11, lines 3 – 10), limiting a band of the code-multiplexed baseband signal (column 10, lines 64 – 67), and D/A converting the baseband signal into an analog signal (column 11, lines 1- 7).

Kornfeld does not teach of calculating a gain set value with which an amplitude value of the baseband signal with the limited band matches a dynamic range in D/A conversion based on the number of transmission codes which is the number of multiplexed baseband signals or adjusting the amplitude value of the baseband signal with the limited band based on the gain set value.

In an analogous art dealing with synchronous CDMA transmission, Rakib teaches of calculating a gain set value with which an amplitude value of the baseband signal with the limited band matches a dynamic range in D/A conversion based on the number of transmission codes which is the number of multiplexed baseband signals or adjusting the amplitude value of

the baseband signal with the limited band based on the gain set value (starting column 75, line 62 and ending column 76, line 18).

It would have been obvious to one skilled in the art at the time of invention to have included into Kornfeld's system of baseband transmission, the system of adjusting dynamic range as described by Rakib for the purposes of operating within the dynamic range of the D/A converter and thus allowing for a cleaner transmitted signal (as internal noise from the D/A converter is present when not operating in the D/A converter's dynamic range), as taught by Rakib.

Kornfeld in view of Rakib do not teach of the line-up of components as claimed. As the purpose of the invention is to provide means such that the dynamic range criteria of the D/A converter is met, it is believed that the merely moving and distributing the function of these components (ie the level adjusting circuit) to achieve this goal is obvious and not novel, as no benefit in changing component position or in distributing its function has been detailed. Therefore, it would have been obvious to one skilled in the art, at the time of invention, to have added multiple level adjusting circuits at the output of the baseband band filters and prior to the summer for the purposes of obtaining a baseband signal that was within the dynamic range of the D/A converter and would thus allow for a less noisy baseband signal to be transmitted.

Regarding claim 15, Kornfeld teaches of a method of controlling a transmission level in a baseband signal multiplexing circuit for multiplexing a plurality of baseband signals spread with different spread codes into one baseband signal, said method comprising: limiting bands of the respective baseband signals input thereto (column 10, lines 64 – 67), adding and code-

multiplexing the respective baseband signals to produce one baseband signal (column 11, lines 3 – 10), and D/A converting the baseband signal into an analog signal (column 11, lines 1- 7).

Kornfeld does not teach of adjusting respective amplitude values of the plurality of baseband signals with the limited bands based on a ratio specifying an amplitude ratio of the respective baseband signals when the plurality of baseband signal are multiplexed, calculating a gain set value with which an amplitude value of the code-multiplexed baseband signal matches a dynamic range in D/A conversion based on the number of transmission codes which is the number of multiplexed baseband signals, or of adjusting the amplitude value of the code-multiplexed baseband signal based on the gain set value.

In an analogous art dealing with synchronous CDMA transmission, Rakib teaches of adjusting respective amplitude values of the plurality of baseband signals with the limited bands based on a specified ratio, calculating a gain set value with which an amplitude value of the code-multiplexed baseband signal matches a dynamic range in D/A conversion based on the number of transmission codes which is the number of multiplexed baseband signals, or of adjusting the amplitude value of the code-multiplexed baseband signal based on the gain set value (starting column 75, line 62 and ending column 76, line 18).

It would have been obvious to one skilled in the art at the time of invention to have included into Kornfeld's system of baseband transmission, the system of adjusting dynamic range as described by Rakib for the purposes of operating within the dynamic range of the D/A converter and thus allowing for a cleaner transmitted signal (as internal noise from the D/A converter is present when not operating in the D/A converter's dynamic range), as taught by Rakib.

Kornfeld in view of Rakib do not teach of the line-up of components as claimed. As the purpose of the invention is to provide means such that the dynamic range criteria of the D/A converter is met, it is believed that the merely moving and distributing the function of these components (ie the level adjusting circuit) to achieve this goal is obvious and not novel, as no benefit in changing component position or in distributing its function has been detailed. Therefore, it would have been obvious to one skilled in the art, at the time of invention, to have added multiple level adjusting circuits at the output of the baseband band filters and prior to the summer for the purposes of obtaining a baseband signal that was within the dynamic range of the D/A converter and would thus allow for a less noisy baseband signal to be transmitted.

Regarding claim 16, Kornfeld a method of controlling a transmission level in a baseband signal multiplexing circuit for multiplexing a plurality of baseband signals spread with different spread codes into one baseband signal, said method comprising the steps of D/A converting the baseband signal into an analog signal (column 11, lines 1- 7), adding and code-multiplexing the respective baseband signals to produce one baseband signal (column 11, lines 3 – 10), limiting a band of the code-multiplexed baseband signal (column 10, lines 64 – 67).

Kornfeld does not teach of calculating a gain set value with which an amplitude value of the baseband signal with the limited band matches a dynamic range in D/A conversion based on the number of transmission codes which is the number of multiplexed baseband signals, adjusting the amplitude value of the baseband signal with the limited band based on the gain set value, or of adjusting respective amplitude values of the respective baseband signals input thereto based on a ratio specifying an amplitude ratio of the respective baseband signals when the plurality of baseband signals are multiplexed.

In an analogous art dealing with synchronous CDMA transmission, Rakib teaches of calculating a gain set value with which an amplitude value of the baseband signal with the limited band matches a dynamic range in D/A conversion based on the number of transmission codes which is the number of multiplexed baseband signals, adjusting the amplitude value of the baseband signal with the limited band based on the gain set value, or of adjusting respective amplitude values of the respective baseband signals input thereto based on a ratio specifying an amplitude ratio of the respective baseband signals when the plurality of baseband signals are multiplexed (starting column 75, line 62 and ending column 76, line 18).

It would have been obvious to one skilled in the art at the time of invention to have included into Kornfeld's system of baseband transmission, the system of adjusting dynamic range as described by Rakib for the purposes of operating within the dynamic range of the D/A converter and thus allowing for a cleaner transmitted signal (as internal noise from the D/A converter is present when not operating in the D/A converter's dynamic range), as taught by Rakib.

Kornfeld in view of Rakib do not teach of the line-up of components as claimed. As the purpose of the invention is to provide means such that the dynamic range criteria of the D/A converter is met, it is believed that the merely moving and distributing the function of these components (ie the level adjusting circuit) to achieve this goal is obvious and not novel, as no benefit in changing component position or in distributing its function has been detailed. Therefore, it would have been obvious to one skilled in the art, at the time of invention, to have added multiple level adjusting circuits at the output of the baseband band filters and prior to the

summer for the purposes of obtaining a baseband signal that was within the dynamic range of the D/A converter and would thus allow for a less noisy baseband signal to be transmitted.

11. Claims 8, 9, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kornfeld et al. (Kornfeld, US Patent No. 5,974,041) in view of Wright et al. (Wright, US Patent No. 6,054,894) and in further view of Rakib et al. (Rakib, US Patent No. 6,307,868).

Regarding claim 8, Kornfeld teaches of a baseband signal multiplexing circuit for multiplexing a plurality of baseband signals spread with different spread codes into one baseband signal comprising a plurality of baseband filters respectively limiting bands of the respective baseband signals input thereto (as seen in Figure 7 and detailed in column 10, lines 64 – 67), an adder for adding and code-multiplexing the plurality of baseband signals with the bands limited by said respective baseband filters to produce one baseband signal (as seen in Figure 7 and detailed on lines 3-7), and D/A converter for converting the baseband signal which is a digital signal (outputted from said adder into) an analog signal (as seen in Figure 7 and detailed in column 11, lines 1- 7).

Kornfeld does not teach of the baseband filters being able to adjusting amplitude values of the respective baseband signals based on a control signal to output the signals nor of a gain setting means for calculating a gain set value with which an amplitude value of the baseband signal outputted from said adder is adjusted to an amplitude value matching a dynamic range of said D/A converter based on the number of transmission codes which is the number of multiplexed baseband signals and for notifying said level adjusting circuit of the gain set value with said control signal.

In a related art dealing with a digital linear nonlinear component power amplifier, Wright teaches of the baseband filters being able to adjusting amplitude values of the respective baseband signals based on a control signal to output the signals (seen in Figures 2 as block 21 and further detailed in Figures 9 and 10, descriptions given in column 13, lines 26 – 29, column 14, lines 13 – 20 and lines 41 – 45).

It would have been obvious to one skilled in the art at the time of invention to have included into Kornfeld's system of baseband transmission, the system of adaptively adjusting the filter parameters as described by Wright for the purposes of reducing IQ cross-talk and DC offsets (both which directly relate to dynamic range considerations, as commonly known in the art) and thus allowing for a cleaner transmitted signal (as internal noise from the D/A converter is present when not operating in the D/A converter's dynamic range), as taught by Wright.

Kornfeld in view of Wright still do not teach of a gain setting means for calculating a gain set value with which an amplitude value of the baseband signal outputted from said adder is adjusted to an amplitude value matching a dynamic range of said D/A converter based on the number of transmission codes which is the number of multiplexed baseband signals and for notifying said level adjusting circuit of the gain set value with said control signal.

In an analogous art dealing with synchronous CDMA transmission, Rakib teaches of calculating a gain set value with which an amplitude value of the baseband signal with the limited band matches a dynamic range in D/A conversion based on the number of transmission codes which is the number of multiplexed baseband signals (starting column 75, line 62 and ending column 76, line 18).

It would have been obvious to one skilled in the art at the time of invention to have included into Kornfeld and Wright's system of baseband transmission, the system of adjusting dynamic range as described by Rakib for the purposes of operating within the dynamic range of the D/A converter and thus allowing for a cleaner transmitted signal (as internal noise from the D/A converter is present when not operating in the D/A converter's dynamic range), as taught by Rakib.

Regarding claim 9, Kornfeld in view of Wright and Rakib, teaches all the claimed limitations as recited in claim 8. Wright further teaches said respective baseband filters includes a plurality of delay elements connected in series, for delaying input signals by a certain time period to output the signals as tap outputs, a plurality of coefficient multipliers, for multiplying each of the tap outputs by a filter coefficient of a plurality of preset filter coefficients that is specified by a control signal, and an adder for adding a plurality of output signals from said respective coefficient multipliers to output the resulting signal (as seen in Figure 10A and detailed column 14, lines 13 – 34).

Regarding claim 17, Kornfeld teaches of a method of controlling a transmission level in a baseband signal multiplexing circuit for multiplexing a plurality of baseband signals spread with different spread codes into one baseband signal, said method comprising the steps of adding and code-multiplexing the plurality of baseband signals with the limited bands to produce one baseband signal (column 10, line 64-67 and column 11, lines 3 –7), and converting the code-multiplexed baseband signal which is a digital signal into an analog signal (column 11, lines 1 – 7).

Kornfeld does not teach of calculating a gain set value with which amplitude values of the respective baseband signals input thereto match a dynamic range in D/A conversion based on the number of transmission codes which is the number of multiplexed baseband signals, of limiting bands of the input respective baseband signals adjusting the amplitude values of the respective baseband signals based on the gain set value by selecting a filter coefficient to be multiplied by each of tap outputs obtained by delaying the input baseband signals by a certain time period.

In a related art dealing with a digital linear nonlinear component power amplifier, Wright teaches of limiting bands of the input respective baseband signals and adjusting the amplitude values of the respective baseband signals based on the gain set value by selecting a filter coefficient to be multiplied by each of tap outputs obtained by delaying the input baseband signals by a certain time period (column 13, lines 26 – 29 and column 14, lines 12 - 34).

It would have been obvious to one skilled in the art at the time of invention to have included into Kornfeld's system of baseband transmission, the system of adaptively adjusting the filter parameters as described by Wright for the purposes of reducing IQ cross-talk and DC offsets (both which directly relate to dynamic range considerations, as commonly known in the art) and thus allowing for a cleaner transmitted signal (as internal noise from the D/A converter is present when not operating in the D/A converter's dynamic range), as taught by Wright.

Kornfeld in view of Wright still do not teach of a gain setting means for calculating a gain set value with which an amplitude value of the baseband signal outputted from said adding means is adjusted to an amplitude value matching a dynamic range of said D/A converting

means based on the number of transmission codes which is the number of multiplexed baseband signals and for notifying said level adjusting means of the gain set value with said control signal.

In an analogous art dealing with synchronous CDMA transmission, Rakib teaches of calculating a gain set value with which an amplitude value of the baseband signal with the limited band matches a dynamic range in D/A conversion based on the number of transmission codes which is the number of multiplexed baseband signals (starting column 75, line 62 and ending column 76, line 18).

It would have been obvious to one skilled in the art at the time of invention to have included into Kornfeld and Wright's system of baseband transmission, the system of adjusting dynamic range as described by Rakib for the purposes of operating within the dynamic range of the D/A converter and thus allowing for a cleaner transmitted signal (as internal noise from the D/A converter is present when not operating in the D/A converter's dynamic range), as taught by Rakib.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tanmay S Lele whose telephone number is (703) 305-3462. The examiner can normally be reached on 9 - 6:30 PM Monday – Thursdays and on alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's acting supervisor, Nay A. Maung can be reached on (703) 308-7745. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9314 for regular communications and (703) 872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 306-0377.

TTL
Tanmay S Lele
Examiner
Art Unit 2681

tsl
April 21, 2003

NAY MAUNG
PRIMARY EXAMINER